

REMARKS

Claims 1-31 are pending in this application. Claims 18-20 and 25-31 have been subjected to a restriction requirement and have been withdrawn from consideration.

Withdrawal of Finality

Applicant notes that the Office categorizes the Office Action of January 29, 2004 as a final Office Action. This is the second Office Action on the merits that the Office has mailed, the first Office Action on the merits having been mailed on July 23, 2003.

In the "final" Office Action, the Office rejected claim 14 under 35 U.S.C. § 112 ¶ 2 as being indefinite for the reasons detailed on page 2 of the Office Action. This is new ground of rejection that was not made in the first Office Action on the merits. Yet claim 14 has not been amended during the prosecution of this application. And Applicant has not submitted an information disclosure statement after the first Office Action was mailed.

Thus, the Office has made a new ground of rejection (of claim 14) that was neither necessitated by amendment nor based on information submitted in an information disclosure statement. But making a second or any subsequent action on the merits final is not permitted where the "examiner introduces a new ground of rejection that is neither necessitated by applicant's amendment of the claims nor based on information submitted in an information disclosure statement" filed after the first Office Action on the merits. *See M.P.E.P. §706.07(a).*

Accordingly, Applicant respectfully requests the Office to withdraw the finality of the Office Action of January 29, 2004.

Restriction Requirement

The Office has still not responded to Applicant's arguments (filed on June 9, 2003) that the restriction and withdrawal of claims 18-20 and 25-31 from examination was improper. The Office has a duty to respond to Applicant's traversal.

Where the initial requirement is traversed, it should be reconsidered. If, upon reconsideration, the examiner is still of the opinion that restriction is proper, it should be repeated and made final in the next Office action. (See MPEP § 803.01.) In doing so, the examiner should reply to the reasons or arguments advanced by applicant in the traverse.... If the examiner, upon reconsideration, is of the opinion that the requirement for restriction is improper, he or she should state in the next Office action that the requirement for restriction is withdrawn and give an action on all the claims.

See M.P.E.P. §706.07(a).

Thus, absent evidence or arguments to the contrary showing by the Office that Applicant's arguments were not persuasive, Applicant assumes that the restriction requirement has been withdrawn. Accordingly, Applicant renews the previous request of withdrawal of the restriction requirement and examination of all pending claims.

Objections To The Drawings

The Office has again objected to the drawings for the reasons detailed on page 2. This rejection has been repeated from the first Office Action.

In response to this objection in the first Office Action, Applicant amended paragraph 40 of the specification to clarify that the numerals "32" and "35" were not both used to designate an implant region. "32" has always been used in the present specification and Figures to designate

an implant region and “35” has always been used to designate a body contact region. *See paragraphs 38 and 40 of the original specification.*

Thus, the numerals “32” and “35” are not both used to designate an implant region and no correction to the drawings is needed for the skilled artisan to understand them. Accordingly, Applicant requests withdrawal of the Objections to the drawings.

Rejection – 35 U.S.C. § 112

The Office has rejected claims 12-17 and 24 under 35 U.S.C. § 112 ¶2 for the reasons on pages 3-4. Applicant disagrees with the Office for the following reasons.

1. The Office argues that claims 12 and 24 contain a limitation (portion of the substrate not containing the nitride-containing layer) that lacks sufficient antecedent basis. Prior to this limitation in both claims, these claims recite “providing a substrate with an upper surface” and “providing a nitride-containing layer on a portion of the substrate upper surface.” From these two limitations, the skilled artisan would understand that a portion of the substrate surface is provided with a nitride-containing layer and, therefore, that a portion of the substrate surface may not contain a nitride-containing layer. Thus, there is proper antecedent basis for the claim limitation at issue. Accordingly, the skilled artisan would have not have understood considered this limitation in claims 12 and 24 indefinite.

2. The Office argues that “polysilicon” in claim 14 should be preceded by “a” and “layer” should be inserted after polysilicon. In other words, the Office argues that claim 14 should recite “a polysilicon layer.” Such an amendment is not necessary. Claim 12 contains the limitation of a conductive layer. Claim 14 merely modifies this limitation in claim 12 by reciting that the

conductive layer is polysilicon. Thus, it is already inherent in claim 14 that the polysilicon is a layer. Accordingly, it is not necessary to amend claim 14 to recite “a polysilicon layer.”

Rejection – 35 U.S.C. § 102(e) over Divakaruni et al.

The Office has rejected claims 6, 12, and 16 under 35 U.S.C. § 102 (e) as being anticipated by Divakaruni et al. (U.S. Published Patent Application No. 2002/014907 A1) for the reasons listed on page 3 of the Office Action. Applicant respectfully traverses this rejection.

The rejected claims are directed to methods for making semiconductor devices by making a trench and then providing an oxide layer on the bottom and sidewall of the trench. Citing paragraphs 0007 & 0008 and Figure 1C, the Office argues that Divakaruni et al. teach such a limitation by providing a stacked silicon nitride/silicon oxide layer 20 on the bottom and sidewall of the trench 16, thereby achieving formation of an oxide on a bottom of a trench. Applicant respectfully disagrees.

The claims recite that the oxide layer is provided “on” the bottom and sidewalls of the trench. As noted in the specification, this oxide layer is a high-quality gate oxide layer. *See Specification at Paragraph [35].* The Office, however, has failed to substantiate that Divakaruni et al. teach such a limitation. Layer 20 of Divakaruni et al. is a node dielectric layer that is part of a capacitor that is formed in the bottom of the trench 16. *See Paragraph [0007].* As such, the purpose of this node dielectric layer is different than the oxide layer of the present claims.

As well, the Office has not shown that the oxide layer of node dielectric 20 is formed on the bottom and sidewall of trench 16. The Office recognizes that node dielectric layer 20 is a layered (or stacked) SiN/SiO structure. *See also Paragraph [0008].* In light of this disclosure, the skilled artisan would have understood that the SiN portion of the node dielectric layer 20 was

formed on the bottom and sidewalls of the trench 16 and the SiO was formed over the SiN portion. Thus, the SiN portion is located between the SiO and the trench bottom and sidewalls. Thus, the Office has not substantiated that Divakaruni et al. teach an oxide layer “on” the bottom and sidewalls of the trench.

For the above reasons, the Office has not substantiated that Divakaruni et al. anticipate each and every limitation in the rejected claims. Accordingly, Applicant respectfully requests withdrawal of this ground of rejection.

Rejection – 35 U.S.C. § 102(b) over Baliga

The Office has rejected claims 1, 2, 5, 12, 14, 15, 17, 21, and 24 under 35 U.S.C. § 102 (b) as being anticipated by Baliga (U.S. Patent No. 5,998,833) for the reasons listed on pages 5-6 of the Office Action. Applicant respectfully traverses this rejection.

The rejected claims are directed to methods for making semiconductor devices by making a trench and then providing an oxide layer on the bottom and sidewall of the trench. Citing Figure 4G, the Office argues that Baliga teaches such a limitation by providing a gate oxide layer 28 on a bottom and sidewall of the trench 20. Applicant respectfully disagrees.

Figure 4G depicts an oxide layer 28 that has been formed in an upper portion of trench 20. *See also Figures 4C and 4D.* The oxide layer 28, however, is formed only the sidewalls of trench 20. *See Figure 4G.* In fact, Baliga describe that the oxide layer 28 is “formed on the exposed trench sidewalls 20a and on the polysilicon region 26.” *See column 10, lines 8-9.* Thus, the Office has not shown where Baliga teaches that oxide layer 28 is formed on the bottom of the trench 20.

The Office contends that Baliga disclose formation of a trench in Figure 4F. It appears that the Office considers the empty space above layers 24 and 26 in Figure 4F as a trench. The Office apparently draws this conclusion by only viewing the Figures of Baliga. Reaching the conclusion in this manner, without considering the entire disclosure of Baliga, is improper because the skilled artisan would not have drawn such a conclusion in light of the disclosure of Baliga.

Baliga describes the preferred method for forming his device in Figures 4A through 4K. *See column 8, lines 22-24.* Trenches 20 are first depicted in Figure 4C, where Baliga disclose that a plurality of trenches 20 are formed with opposing vertical sidewalls 20a and a trench bottom 20b. *See column 9, lines 22-31.* The bottom portion of trench 20 is filled with an insulating region 24 and then polysilicon region 26, leaving an upper portion of trench empty. *See column 9, line 50 through column 10, line 9.* This leaves the upper portion of the trench 20 as depicted in Figure 4F.

Through the entire process illustrated in Figures 4A through 4K, the trench is always depicted as 20, sidewalls as 20a, and bottom as 20b. As well, the entire process described in columns 8-10, the trench is always described as 20, sidewalls as 20a, and bottom as 20b. Importantly, neither Figure 4F nor the description in columns 8-10 ever refer to the upper part of the trench 20 above insulating region 24 and conductive layer 26 as a trench separate from trench 20. In light of this description, the skilled artisan would have understood that the only trench depicted in Figure 4F is trench 20, with the bottom part of the trench 20 filled with insulating region 24 and conductive layer 26 and the upper part of trench 20 empty. The skilled artisan would have further come to this conclusion in light of the description of the device formed in

Figure 3 where gate electrode 127 and source electrode 128a are purposefully formed in the single trench 120. *See Figure 3 and column 7, lines 28-40.*

For the above reasons, the Office has not substantiated that Baliga anticipates each and every limitation in the rejected claims. Accordingly, Applicant respectfully requests withdrawal of this ground of rejection.

Rejection – 35 U.S.C. § 103 over Baliga

The Office has rejected claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Baliga for the reasons listed on page 3 of the Office Action. Applicant respectfully traverses this rejection.

As detailed above, the Office has not shown where Baliga teaches that oxide layer 28 is formed on the bottom of the trench 20. Nor has the Office argued—much less alleged—that the skilled artisan would have been motivated to modify Baliga to form the oxide layer 28 on the bottom of the trench 20.

Thus, the Office has not substantiated that Baliga teaches or suggests each and every limitation in the rejected claims. Accordingly, Applicant respectfully requests withdrawal of this ground of rejection.

Rejection – 35 U.S.C. § 103 over Divakaruni et al. and Baliga

The Office has rejected claim 22 under 35 U.S.C. § 103(a) as being unpatentable over Baliga in combination with Divakaruni et al., for the reasons listed on page 4 of the Office Action. Applicant respectfully traverses this rejection.

As detailed above, the Office has not shown where Baliga teaches that oxide layer 28 is formed on the bottom of the trench 20. Nor has the Office argued—much less alleged—that the skilled artisan would have been motivated to modify Baliga to form the oxide layer 28 on the bottom of the trench 20.

As well, the Office has not shown where Divakaruni et al. teach that the oxide portion of the node dielectric 20 is formed on the bottom of the trench 16. Nor has the Office argued—much less alleged—that the skilled artisan would have been motivated to modify Divakaruni et al. to form the oxide portion of the node dielectric 20 on the bottom of the trench 16.

Thus, the Office has not shown that either cited reference teaches or suggests this claim limitation. Accordingly, the Office cannot show that the combination of references suggests this limitation.

For the above reasons, the Office has not substantiated that the skilled artisan would have considered claim 22 obvious over the combined teachings of Baliga and Divakaruni et al. Accordingly, Applicant respectfully requests withdrawal of this rejection.

Allowable Subject Matter

Applicant appreciates the indication that claims 3, 4, 7-11, and 23 contain allowable subject matter. Accordingly, Applicant has amended these claims to include all the limitations of the base claims and any intervening claims. Applicant has not amended these claims to overcome the rejection under 35 U.S.C. §112 ¶2 because claims 3, 4, 7-11, and 23 were not rejected under this statute.

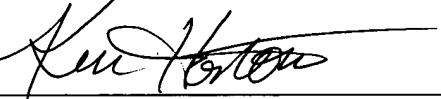
CONCLUSION

For the above reasons, as well as those of record, Applicant respectfully requests the Office to withdraw the pending grounds of rejection and allow the pending claims.

If there is any fee due in connection with the filing of this Amendment, including a fee for any extension of time not accounted for above, please charge the fee to our Deposit Account No. 50-0843.

Respectfully Submitted,

By


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